VI. *A Botanical Description and Natural History of the Malabar Cardamom. By Mr. David White, Surgeon on the Bombay Establishment. Communicated by the Directors of the Hon. East India Company. With additional Remarks by William George Maton, M.D., V.P.L.S., &c.*

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The plant producing Cardamoms is a singular, if not unique, instance of one of the most valuable articles of modern luxury being almost entirely indebted to the care of nature for its growth and perfection.

Lofty hills, whose summits are ever clothed with clouds, a moist atmosphere, or copious rains for three-fourths of the year, and an exposure admitting but a limited proportion of the sun-beams, are the circumstances which, the natives tell us, and experience proves, are most favourable to its growth, and are the sole requisites for an abundant crop. Simple as the progress is which conducts it through various stages to maturity and a marketable state, the subject claims attention, and derives importance from the general estimation and extended use of the spice, as a grateful and salubrious accessary of diet: its use as such is so universal, that it is now in a manner regarded as a necessary of life by most of the inhabitants of Asia; and its general adoption by the civilized nations of the other quarters of the world is prevented only by its limited importation. The possession of its trade has been

always an object of much competition; and the best sources of it being now in possession of the English, accumulate fresh considerations for becoming better acquainted with its history.

When it is further premised, that the information here given is founded on documents ever judged most likely to attain the object of all useful investigation, namely, the testimony of intelligent natives on the spot, and actual inspection during a temporary residence undertaken for the purpose, the writer deems no further apology necessary for bringing forward the fruits of his observation.

I.

BOTANICAL DESCRIPTION.

Monandria. Monogynia.

Amomum Cardamomum.

Calyx double, each spathous and tubular. *Outer and inferior* arising from the proper pedicle, embracing the inner calyx to near its summit, split before, keeled and pointed behind, withering. *Inner and superior* funnel-form, lax, continuous with and rising from the top of the germen, ascending with and reaching above the middle of the tube of the corolla. Border 2- or 3-cleft, unequally finely scored, permanent.

Corolla monopetalous, funnel-form. *Tube* ascending, cylindrical below, compressed a little upward, marked with three superficial furrows, evanescent as they descend from the divisions of the inner border. *Border* double, unequal. *Inferior and outer* reflected to the interior, membranous, 3-parted. Divisions oblong-linear, obtuse, with margins a little inflected, and ends turned up slipper-wise; the middle

or

or anterior one larger; a double linear band running along the centre of each. *Interior and upper border* fleshy, four-parted, unequal. The posterior division large, ascending from a contracted base, expanding rhomboidally; margin a little wavy, and obscurely three-lobed, centrally grooved half way up. The second, or what may be called the staminal division, half the length of the former, erect from the opposite side of the rim of the tube, linear nearly to half its height, then abruptly expanding in breadth and thickness to nearly double, lopped and tooth-like at the top, sloping inwardly into a shovel-like vaginal hollow, to receive the stigma and upper part of the style; a slight score bisecting it externally, and ending in an obsolete notch above. Third and fourth divisions exactly opposite to each other, and between the two former a pair of short, horizontal, horn-like processes slightly twisted, straitening the mouth of the tube and dividing it unequally.

Stamen with no filament, two pair of parallel antherous lines lying on the inner thickened part of the second division, contiguous below, but with their conical points free, and projecting into the mouth of the tube, diverging upwards to receive the expanded stigma and upper part of the style, their surface, and the space they inclose, heaped with globules of farina soon bursting into the finest pollen.

Pistillum shorter than the corolla, and of the length of the stamen.

Germen a lopped oval, smooth. Two conical segments erect from one side of its top contiguous to each other, half sheathing the style.

Style conical at its origin, then thread-like, lastly enlarging at

the rim of the tube; passing which, it is received into the staminal sheath of the upper border.

Stigma obtusely triangular, a little excavated on the side of the tube, with the upper rounded edge prominent from the sheath.

Pericarpium a fleshy, fibrous, smooth capsule, contracting when dry into a surface corrugated lengthwise, obtusely trigonal, oblique a little; angles marked with a superficial score; sides inwardly bisected by a ridge; three-celled, with three valves. Seeds many, nidulating by means of a fine mucilaginous, splendid, silky membrane, and attached to the receptacle, or *rachis*, by an eight-toothed oblong fascia in each of its angles; the silky membrane of the seeds forming filamentous pedicles for this purpose. Seeds from 18 to 27, obtusely wedge-shaped, a furrow on the plain side, convex on the other; surface scabrous, hard, horny.

Flowers on lax panicled peduncles, issuing horizontally from the tuberous ringed part of the stem, near the root; generally two from each flat side. Common peduncle serpentine, jointed, or rather rimmed, tapering. Partial peduncles lateral from the rings at acute angles, and diminishing intervals; every partial peduncle supporting from two to four pedicled flowers, one or two of which abortive. Length of the peduncle varies from three and four inches to one and a half and two feet.

Bracteæ oblong, acute, and spathous, accompanying and enveloping the pedicles at their origin, withering.

Colour. Lower division of the corolla green; upper spreading petal of the inner border with a pink ramification, pale white on the outside and the rest of the border.

Stems.

Stems. Base tuberous, clubbed, ring'd rim-wise for two or three inches; the lower part giving out viviparous shoots, the upper part panicles. Stems erect from the base, and slightly elliptical, tapering as the continuous sheaths send off the leaves; when bearing, from six to twelve feet high, and from eight and twelve to thirty in number, quite smooth to the touch, finely scored to the eye, with varying shades of glossy green, pale at the base, which distinguishes this species from a congener frequent on the same site, but with a red or fuscous base.

Leaves very long, in the same plane, alternate, at distances a little unequal, supported on long sheaths embracing closely half the stem, elliptico-linear-spear-pointed, from nine inches to two feet and a half long, from one to five inches broad, upper side waved with narrow ridges and broad furrows acutely with the middle rib, smooth, dark-green, edges very entire, below pale sea-green, and glossy with a silky softness, middle rib channelled above, keeled below. Petioles short, grooved with a small obtuse squamous process embracing the stem above the sheath.

Roots fibrous, thinly ramose, and with here and there a fibre much longer and larger than the rest running obliquely into the soil.

There is no individual of the Amomum tribe that displays so much natural beauty as the Cardamomum. The glistening polish of its stems, the sea-green glossy surface of its leaves waving with the least impulse, and the general symmetry of the whole, easily distinguish it from its rival neighbours in the woods. It outshines them also in the elegance of its flowers: the vivid pink, surrounded by the pale white of the spreading division of

of the upper border of the corolla, presents a most delicate contrast.

The shortness of its roots may relate to some hidden properties of its organic œconomy; or these may be compensated by the greater proportion of the leaves, absorbing more copiously from the air, and thus contributing to the formation of that elaborate essence which we so much admire in the perfect spice.

It may be expected that we should give some account of the name and the history of its commerce.

In Botany, the history and origin of names are so far useful, as they are immediately or remotely connected with the elucidation of the subject in question, the indication of its virtues, or the nation who first introduced its use, and the channels, if an article of trade, through which it first flowed to civilized countries.

In Malabar, the native soil of its best species, it is simply named *Ela*, or *Ela-tari* and *Ela-channa;* the former addition signifying a young plant, the latter a full-grown one. The word *channa* includes also some congeners, one of which, *Poiân-channa*, is so like the real Cardamom in appearance and foliage, as with difficulty to be distinguished by these marks only.

The ripe pod is styled exclusively *Ela-tari*, *ari* in Malabar signifying any small grain: e. g. *ari* rice, *mout-ari* natcheny or raggee.

Indiscriminately they also say *Ela-kai*, the last word being of general application to all kinds of perfect roots and seeds. In Sanskrit, the most common appellative is *Ela.* The synonyms are no fewer than 10, *viz.* *Elum** *Walakum*, *Mailayum*, *Songani*, *Hari Walakum*, *Waleyiegum*, *Moukana*, *Kouna*, *Kounara*, *Agni-jivala*,

* My authority tells me that *Elum* is the *casus rectus* or nominative here, and that it becomes varied into *Ela* in the oblique inflections, or when annexed to other words which govern it. The same grammatical variation is also observed in the Malabar language. *Moudriwadine.*

Moudriwadine. These are taken from idioms of the Amarsinha; but there is reason for supposing that all of them, except the first, are merely epithets, either allusive to its qualities and virtues, or suggested by that wild and extravagant fancy which characterizes the genius of Indian fabulists and poets. As *Ela* signifies leaf in both languages, I have no doubt but the assemblage of leaves, forming the most obvious and striking appearance of the plant, suggested to the first rude observers the natural and appropriate term. In the other parts of India, they give it names, all more or less similar to the indigenous. The Hindu is *Hil-Il*, or *Ilachi*; the Kanarese, *Ela-Ki*. These terminations are no doubt deduced from the *Kai* above mentioned, as the first syllable is from that of *Ela*.

Of the name Καρδαμωμον given to it by the Greeks, and *Cardamomum* by the Romans, neither I, nor those whom I consulted, can find any traces in the dialects of Hindostan. I am therefore inclined to conclude that the spice itself was not introduced among them, till at a late period of their history, and by some very circuitous or irregular channels, which left them to their own ingenuity to adapt a significant epithet: for this they had recourse to analogy. In their own language the Greeks had the word Καρδαμον to signify cresses, a production that approached to the nature of a spice, as near as to form the foundation of a comparison. When they added to this a word of superlative emphasis—αμωμον, (literally signifying perfect or faultless,) they may have conceived that they attained a tolerably clear idea of their new-imported luxury.—*Kakele*, both in Arabic and Persian, is, without doubt, connected with the indigenous *Ela*, or perhaps a compound of it.

In the medical practice of Europe, the use of Cardamoms is too limited to enable us to form a sufficient estimate of their stimulant

stimulant power. They are seldom given alone; and their combination with other stimulants must render their effects uncertain. It is not unlikely that the high degree of acrimony ascribed to them by the natives may be comparative only to their own bland constitutions, the more susceptible of stimulus from their simple diet, and moderate and uniform habits of living.

It would be an object of considerable curiosity, if not some instruction, to trace the gradual introduction of Cardamoms into Europe, and their general adoption as a luxury, or use as a medicine. We have reason to think that they were little, if at all, known before the time of Augustus; and the silence of the Bible relative to them, proves that both the spice and its virtues were alike unknown to the Jews, and probably their neighbouring nations. This singular fate of a valuable luxury, and the circumstances connected with it, deserve further investigation.

I need scarcely refer to the description of Rumphius, as it is so very imperfect in detail respecting both the botanical and the natural history of the plant; but he disarms criticism and all attempt at censure, by his usual candour in confessing that it was taken from an exotic, which did not produce a perfect fructification, and of which the species is evidently different from that of Malabar, and is most likely the *Grana Paradisi.* He talks of the roots being tuberous and having the flavour of the spice, whereas the subject of the present sketch is without these marks, the taste of the radical fibres being nearly insipid, and though the leaves, on being chewed, leave behind them on the throat and palate an acrimonious sensation, no *aroma* analogous to that of the spice is discernible. The accuracy of his information may also be suspected, when he states that Cardamom is a name common all over Upper Hindostan. He may have been misled by Armenian merchants, who had

had borrowed the appellation from the Greeks in the early period of its commerce; in which, most probably, they either directly or indirectly largely participated.

II.

THE CARDAMOM FARMS.

The spots chosen for these, called in the Malabar language *Ela-Kandy*, literally signifying Cardamom plots, are either level or gently sloping surfaces, on the highest range of the Ghaûts, after passing the first declivity from their base. The extent of climate hitherto known in Malabar to produce them lies betwixt 11° and 12° 30′ N. Lat. or thereabouts.

Steep places and the very summits of the hills would, the natives acknowledge, be also productive,—but with such an accumulation of labour, and in a quantity so stinted, as not to repay the additional pains: but here we must take into account their blind attachment to beaten tracks of cultivating, and their obstinate aversion to all attempts at improvement.

The months of February and March are, on account of the prevailing dry weather, selected as the most proper for commencing their labours; the first part of which consists in cutting down the large and small trees promiscuously, leaving, of the former, standing at nearly equal distances, certain tall and stately individuals, adapted to that degree of perpendicular shade which experience teaches them to be most favourable for the future crops. They affirm, and with some reason, that no little exactness is required in hitting this prolific medium; for, as too much sun burns up, so does excessive shade alike disappoint the hopes of harvest. The grass and weeds are then cleared away, and the ground disencumbered from the roots of the brushwood;

the large trees lie where they fall; the shrubs, roots, and grass are piled up in different small heaps, and their spontaneous and gradual decomposition fertilizes the space they cover *.

They mention it as an infallible sign of future fertility, if the large trees, on falling, cause a *trembling* of the adjacent soil or mountain, as their phrase is; though it is not very probable that they ever reject a spot once chosen and begun upon, from the absence of this equivocal and perhaps imaginary symptom. Yet, if it really does take place, a rationale may be applied to explain it; for, as the soil of those woods is a very fine mould, soft and rare in proportion to its volume, so, where thin, and superficially intercepted by rocky or gravelly strata, it is not likely that it will be much affected by the gravity of the fall. On the contrary, if of great depth, the shock will be readily felt, and the commotion communicated through the spongy mass, connected as it is by a close intertexture of roots and fibres, and thus exciting in the sanguine and simple fancy of those children of nature an assimilation to an earthquake.

The size of the *Ela-Kandy* is various; sometimes from choice, at others, determined by the nature and extent of the surface or slope. The largest I saw among fifty did not exceed 60 yards in one diameter, and 40 in the other. Their form varies likewise, very commonly oblong or oval, sometimes a contour irregularly rounded. The variety in these respects is chiefly owing to the convenience of the standard or permanent trees for shade. Those with lofty strait stems, extensive heads, and that are in an adolescent state, and known to be long-lived, are preferred for this purpose, and left standing at 15 or 20 yards from each

* Mr. Pennant has therefore been led into an error in saying that ashes procured by burning on the spot are used as manure.—Vide Pennant's India, vol. i.

other.

other. Much more diminutive plots are also cultivated by a race of Hill People called *Kourchara* and *Cadera*, who are not exactly slaves, but locally attached, and acknowledging certain obligations of a feudal and perhaps reciprocal kind to the Nairs in the neighbourhood. They are, of course, permitted to reap the produce of their separate industry, without the participation of these superiors.

After the operations now described, no further labour is bestowed for four years. At the revolution of the fourth rainy season, and towards its close, they look for a crop, and their hopes are rarely disappointed: this first effort of nature is generally scanty; for instance, only one-half of what is reaped the following year, and only one-fourth of what is yielded after the sixth rains, at which period the plant has reached its acme of prolific vigour. Now and then, however, this routine is interrupted, and its progress protracted, by causes of which they are not very solicitous to investigate the nature: they remark, however, excessive and uninterrupted rains to be one source of failure.

In the dry season succeeding to the first crop, they grub up the undergrowth of shrubs, and clear away the weeds and grass, laying them up, as before, in heaps to rot; for in no case do they set fire to these, the consequence of which practice would be the certain failure of the crops. This agrees with the most approved ideas of agriculture even in Europe, where the most substantial and copious manures are produced from the mouldering piles of weeds, and vegetable offals of every description.

This process of cleaning being yearly repeated, the same spot will continue productive for 50 years and upwards. My informers would not specify any term or number; they said that it exceeded their habits of computation, and the memory of any one generation. Another opinion similarly founded is, that the

exhausted Ela-Kandy will require an equal period of years before it recovers by rest its ancient vigour. Both limits are so far explicable on natural principles, and appear to be regulated by the exhausting and accumulating excitabilities inherent in the soil, and operated upon by a continuance of the same crop. The successive decay and fall of the large standard trees, destroying one of the most essential conditions of the prosperity of the plantation, is another and evident circumstance determining the period of its duration.

The reproduction of the same trees, to a size capable of sheltering the young plants, will give the least measure for the quiescent state of the ground, and this cannot be less than twenty or thirty years, considering their average growth.

The barren state of one Ela-Kandy is immediately replaced by the establishment of another on a fresh side, and with similar properties to the former; in the choice of which they can never be at a loss, from the great extent of mountain and wood in a state of nature; and, the same operations repeated, the customary routine of crops will follow.

As the Cardamom plants spring up from scattered seeds dormant on the spot, or washed thither by rains from the adjacent parts, we do not find any regularity in their disposition, nor is the industry of the natives ever exerted to correct this. Accordingly we see them variously grouped; in some places crowded and extremely luxuriant, in others thin and stunted; some roots sending forth from twenty to thirty stems, two-thirds or three-fourths of which bear; others from eight to twelve, and down to four or five. Hence it is difficult to calculate the rate of produce in any one plant. Each stem sends forth from its thickened base from two to four strings or fructiferous panicles; from these issue alternately short clusters bearing from two to three ripe pods.

The

The length of the common string or stalk varies from four inches to eighteen, and is sometimes two feet; but these last extremes are not fertile in proportion. In good years, from four to six plants will yield of dried pods one *dungally*, a measure of capacity equal to four pints Winchester.

The number of plants in an Ela-Kandy they never think of reckoning. It struck me, on traversing them repeatedly, that the largest plots might contain from twelve to fifteen hundred.

The abundance of crop, from every inquiry I could make, is best ensured by a moderate routine of weather, with respect to dry and wet: the extremes of each are injurious: they dread most, however, deluging rains, particularly for the young plantations, and during the flowering season, which commences on the first fall of the rains in April and May, and continues for two months. The flower being very delicate, and the recumbent and repent posture of the fruit-panicles, exposes them particularly to the bad effects of drenching moisture. Repeated torrents, descending from above, commit their devastation by baring the roots, and sweeping away the finest portion of the mould, which furnishes a nutriment so essential to the vigour of the plants. What tends to confirm this statement is, that the natives remark a very general contrast betwixt the Cardamom and Pepper crops. The seasons favourable to the great produce of the latter are found to be adverse to the former, and *vice versâ*. Now it is well known, that, in the early part of the season, the rains cannot be too copious for the Pepper vine. In August and September, the pods increase and acquire the greatest size. In the first half of October, they begin to ripen; then the gathering of the earlier part commences; the reaping proceeds through all that month and November. A longer than usual continuance of the rainy season may protract the final gathering till the middle of December.

About

About a fortnight earlier than here stated, the Cardamoms on the western or sea-side of the Ghaûts are gathered; and to this they give the name of the *Kanni* crop, or that of the month answering to the period from the middle of September till the 15th of October: the other above the Ghaûts they style the *Wretchagau*, from the month answering in like manner to our November —December.

The prior maturity of the former is ascribed, and not without reason, to the milder temperature of the ocean cherishing the western exposure, while this gives them the full effect of the sun's beams till he sets. It is also found that, during the rainy monsoon, the intervals of fair weather are more frequent than above the Ghaûts; all which circumstances create an equability of climate favourable to the earlier production of the spice. The process of reaping keeps pace with the simplicity of the previous management. A dry day being chosen, the fruit-stalks are plucked from the roots, carried to their houses, and laid out to dry on mats placed upon a thrashing-floor: a series of four or five dry days is sufficient to complete the desiccation. The pods being extricated, by stripping with the fingers, are separated into three or four sorts, denominated from their respective qualities: 1. *Talli-Kai*, the head fruit; 2. *Nadu-Kai*, the middle; and 3. *Poulo-Kai*, the abortive fruit. The last being thrown away, the two former are mixed together; the purpose of the separation being to ascertain the relative proportions, and to render the whole uniform and marketable. They are then laid up in mat-bags made of the *Pandanus sylvestris* of Rumphius, a plant growing every where around their houses and fields. These bags are of two sizes, one holding 32 pounds avoirdupois, or a Company's *maund* in Malabar, and the other 16 pounds.

The bundles thus prepared by the cultivator are immediately carried

carried down to shops, or little storehouses, erected by Mopla merchants, or agents, in different places along the whole range of hills, and at a little distance from the farms. Here they are subjected to another and final operation by the venders to the wholesale merchants on the coast. This consists in holding them over a gentle and slow fire in flat baskets, while the assistants continue rubbing them betwixt their hands for a certain time; which has the effect of detaching what remains of the permanent calyx and foot-stalks, or other adhering membranes, and gives the pod that appearance and marketable quality delineated in Tab. V. figs. 14 and 15. This operation is termed in Malabar *Terimbous*, a word expressive of its nature. The Cardamoms are now weighed for the purpose of ascertaining the respective quotas of rent payable by the different farmers. The result of this is expected to correspond with a previous estimation of the quantity of the crops, taken on the ground before they arrive at maturity; on the approach of which, an official deputation, consisting of public officers and some of the head men of the country well acquainted with the subject, repairs to the *Ela-Kandys*, attended by the proprietors, and there makes the calculation from the combined consideration of the extent of ground, age of the plantation, and general appearance of the fruit-stalks then in full bearing. Four or five of the visitors, whose interests are supposed to be neutral, and equally unbiassed betwixt Government and the Ryot, successively and seriously deliver their opinions; from the average of which the official attendants strike a mean, and mutual satisfaction is generally the consequence. This previous step is designed to serve as a comparative check to the measuring after the final drying of the pods, when they are expected to bear the proportion of one-fifth to the quantity of the green as before estimated.

estimated. This proportion is judged to be most favourable to the proprietors, as actual experiments prove it at least to be as 25 to 100; but Government is thus moderate, to encourage the honesty of the farmers, and to remove all inducement to its clandestine exportation. The duties, or customs, are paid only on exportation from the province by sea or land: they amount to twelve per cent., and the average price is rated at 1200 rupees per candy of 640 pounds avoirdupois.

The total produce of Wynaûd may amount, one year with another, to something above fifty candies, perhaps fifty-six; and this grows on an extent of more than 100 miles, reckoning the sinuosities and angles of the hills. The kingdom or country of the Coorja Rajah produces less by ten or fifteen candies. The whole site of the growth of this spice on the continent of Hindostan extends from the Soubramany Ghaût, nearly due east from Mangalore, to Mannaar Ghaût in the same direction from Calicut.

If nature be propitious to the progress of this valuable production from youth to maturity, she has been no less kind in providing for this last stage, in refusing to the generality of the inmates of the forest any appetite for the fruit. The natives mention only a few of the smaller animals whose depredations are felt, *viz.* two kinds of squirrels, a large and small species, and the field rats; but as they did not dwell much on the damage thence accruing, it is to be presumed that it cannot amount to much.

The evils attendant on the reaping to the Kourch-ara, Pani-ara, &c., who perform the labour, are much more serious. The sting of the green whip-snake, abounding in those situations, is instantly fatal, no antidote having yet been found to arrest its poison.

Fevers

Fevers and fluxes commit ravages much more extensive.—The season of reaping coincides with that when the insalubrity of the air happens to be at its highest pitch: the great heats of October, succeeding to the equinoctial rains, operating upon a drenched soil, and exhaling vapours from a profusion of luxuriant undergrowth, must accumulate a mass of *miasmata* which becomes more intensely noxious by stagnation, a circumstance of itself well known to have a tendency to corrupt or alter the healthy proportions of the respirable fluid, and thus lay a sure foundation for the diseases mentioned. A more directly painful calamity is never escaped,—that is, numerous bites of leeches (a small species of *Hirudo geometra*) whose numbers are infinite, and attacks incessant. Their size varies from two to six lines. Their minuteness and gentle mode of suction seldom engage attention or excite precaution; but, true to the ancient definition, "*non missura cutem, nisi plena cruoris,*" they only fall off when glutted with blood, the copious flow of which at length indicates the authors. The simple consequence of these would be otherwise little felt, were it not for the abundance of a small shrubby plant, whose leaves are so acrid, or rather caustic, as to inflame by simple contact the sound skin for more than a day, as I experienced in myself; and if they touch a wound made by the leeches, the inflammation is sure to increase; and most frequently extended ulcerations, phagedenic in their progress and fatal in their termination, succeed, the symptomatic fever excited running so high as to carry off the patient, who conceives himself happy if he escape with only a contraction of the member or muscles thus affected. The name of the plant in question is *Mouricha*, denoting in Malabar its cutting or acrimonious quality. It is from eight to twelve feet high, with large leaves acutely oval and subserrated; trunk from two to three

inches in diameter. The absence of flowers prevented its genus being ascertained.

Though the natives of both Wynâad and Coorga affirm that the situations at present, and from time immemorial, producing Cardamoms, are the only places where they will thrive; yet, as they assign no reason for this, nor mention any experiments having been made to prove the fact, we have every right to doubt their testimony, and refer their opinion to those habits of indolence and local prejudice, which characterize the peasantry in most countries, and which beget in them a stupid aversion from all schemes of innovation and improvement. This sceptical suggestion receives great strength, if not confirmation, from a series of facts which have come under my own observation. The following is their history:

In October 1802, when the rebellion broke out afresh in Wynâad, I accompanied the first force sent to quell it. We fortified different points at the top of the Ghaûts, some in the neighbourhood of Cardamom ground, others where no farms had ever been established or thought of. Of this last description was a post at the top of Cottiour Ghaût. Besides clearing away the grounds adjacent, a great many broad alleys, leading from the redoubt in various directions through thick and lofty trees, down and around the hills to Darallour, (another stockade two miles further inland,) were cut and cleared from grass and underwood by the pioneers. All these places I had the good fortune to revisit the first ten days of this month (October 1806), and was much gratified and interested by finding great abundance of the Cardamom plant growing luxuriantly, and bearing in a proportion equal to what I immediately afterwards observed at the Peria Ghaût. No further labour had been bestowed on them after our departure; and the similarity of shade and exposure,


c
a
b

posure, from the largest trees being left standing here and there, had produced the same effects as elsewhere. In the very middle of the stockade, and on the site of the barracks, I had the curiosity to reckon the assemblage of stems on two plants, one of which sent forth twenty-six and the other thirty-two, both fertile in the usual proportion. I found likewise that high summits and steep declivities were alike favourable to the prosperity of the plants; for the stockade itself was built on the declivity of a high range, and the alleys mentioned led in various windings down the steepest slopes.

All this ought to convince us, that experiments judiciously instituted, and properly prosecuted, are alone wanting to extend the Cardamom farms over a much larger space; and that moreover, by the knowledge acquired in the course of this experience, we should most probably attain to some essential improvement in the modes of cultivation at present adopted.

REFERENCES TO THE FIGURES.

Tab. IV.

A Cardamom plant about three months old, one-fourth of the natural size.

a, *b*. Two viviparous scions springing from its base.

c. The involuted leaf before evolution.

Tab. V.

Fig. 1. exhibits a full grown Cardamom plant, its stems cut off a little above the third of its height, which was 12 feet: base of stems immediately above the rings from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches in girth. Its roots depending in their natural habit, pro-

 portion,

portion, and colour. *a*, *a*, *a*, the tuberous ringed part immediately above ground, with the curved shoots *b*, *b*, *b*, *b*, germinating, the common peduncle with its pedicles and partial frugiferous pedicels.

Fig. 2. The partial panicle with its germs and flower viewed in front. *a*, *a*, the double calyx. *b*, *b*, the spathous bracts. *c*, *c*, *c*, the three divisions of the outer and lower border of the corolla, the middle largest, and their extremities turned up slipperwise. *d*, the second or staminiferous division: at the base of this the hornlets seem to project from the mouth of the tube horizontally. *e*, the expanded rhomboidal division of the upper border, with its pinky ramification.

Fig. 3. The back view of the corolla. *b*, the germen. *c*, *c*, the projecting pair of hornlets, i. e. 3d and 4th divisions of the upper border.

Fig. 4. The tube only of the corolla, with the inner calyx, hornlets and stamen bearing division of the upper border. *a*, *b*, show the two pair of antherous lines in situ, and the sheath above for the stigma *c*, this last being turned to one side.

Fig. 5. The same without the calyx. The second division and hornlets a little magnified. The anthers *a*, *a*, raised up and deflected, to show the sheath more fully.

Fig. 6. The second division *a*, of the upper border magnified, showing the upper part of the style stigma and anthers in situ, lying on its inner surface, and the style ascending through the orifice *b* of the tube, straitened by the bulging basis of the hornlets.

Fig. 7. 8. The naked pistilla, one with the germinal appendices *a* a little separated, the other with the same in situ.

Fig. 9. A half-grown germen, with the persisting inner calyx, and its 3-dentate border *b*, and germinal appendices *a*.

Fig.

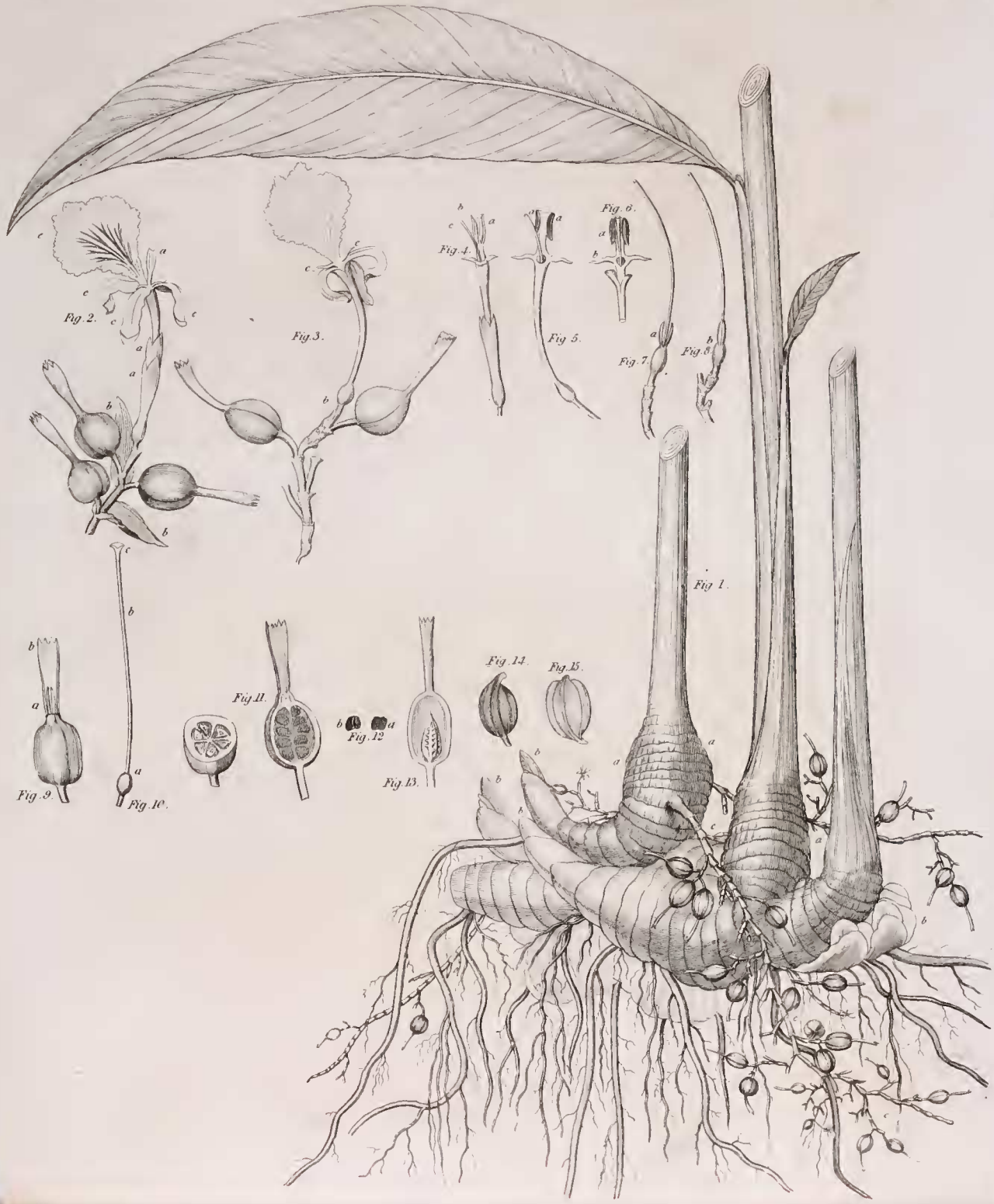
Fig. 1.
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Fig. 12
Fig. 13.
Fig. 14.
Fig. 15.

Fig. 10. The naked pistillum a little magnified, showing the conical base of the style *a*, thickening again at *b*, and the expanded stigma.

Fig. 11. Longitudinal and transverse sections of the full-grown pericarpium, as it is taken from the plant, and before drying.

Fig. 12. Two seeds a little magnified, *a* the convex side, *b* the flat grooved one.

Fig. 13. The bare capsule, one side removed to show the triangular rachis or seed-receptacle, with one of the eight-toothed belts or fasciæ lining one of its angles—viewed in front.

Fig. 14. 15. The Cardamom pod, as it comes to market from the drying processes.

Additional Remarks by William George Maton, M.D. V.P.L.S. &c. &c.

IF the author of the foregoing valuable communication had been conversant with Mr. Roscoe's arrangement of the *Scitamineæ* (in the 8th volume of The Linnean Transactions), it is most probable that he would not have referred the plant producing the Malabar Cardamom to the genus *Amomum*, notwithstanding it has hitherto been placed under that appellation by most other botanical writers.

The filament, or antheriferous petal, of *Amomum* (according to Mr. Roscoe) extends beyond the anthera, and terminates in three lobes; whereas, in the plant so fully described and minutely figured by Mr. White, the anthera is of equal length with the filament, and appears to be somewhat emarginated, the notch receiving the obtusely triangular stigma. Neither can this plant be considered

considered as an *Alpinia*, or an *Hellenia*, without great violence to its natural characters, for the inflorescence issues horizontally from the tuberous, annulated part of the stem, near the root; but in the *genera* just mentioned it is terminal, from the extremities of the leafy shoots,—a difference (as Mr. Roscoe also remarks, in a letter with which he has favoured me on this subject) too great to be made a mere *specific* distinction; and I cannot help suspecting that the fruit, likewise, will be found to be different, though my opportunities of investigation have not been sufficient to warrant my being confident on this point. From *Philydrum* there is a sufficient distinction in the absence of the woolly appendage at the base of the tube, and from *Hedychium* in the anthera not being placed marginally on the filament. According to Mr. Roscoe, all the *Renealmiæ* (except *R. exaltata* perhaps) are reducible to the genus *Alpinia*, their inflorescence being terminal; and the description of *R. exaltata*, as given in the *Supplementum Plantarum*, cuts off that plant from a generic alliance with the Cardamom, the fruit of the former being a cylindrical *bacca*, containing seeds perfectly smooth.

Hence it seems necessary to place the Cardamom under a new genus, to which I propose to affix the name of ELETTARIA, from *Elettari*, the original Malabar appellation, as given in the *Hortus Malabaricus*. I cannot help considering it as premature to attempt to draw its botanical characters in a regular manner, until opportunities are afforded of comparing this plant, in the different stages of fructification, with its congeners, particularly *Amomum* and *Alpinia*, of which perfect specimens in a living state ought to be carefully investigated, before any discriminations can be satisfactorily established. In the mean time, it may be of some importance to collate the figures and descriptions

tions given by various authors, and to extricate from the unaccountable confusion, in which the botanical history of the Malabar Cardamom has been involved, such synonyms as ought to accompany it in its future station in the *Species Plantarum.*

What the Cardamom of the ancients was, it is now scarcely possible, I think, to determine, so imperfect are the notices of it which they have left behind them. There is good reason to suppose however, that the article bearing that name in their *Materia Medica*, was not the common Cardamom of our shops. Both Clusius and John Bauhin appear to have been convinced of this, and to neither of these early authors, nor indeed to Caspar Bauhin, are we to ascribe any of the inaccuracies that have found their way into later descriptions of this celebrated aromatic; but the plant producing it was not satisfactorily made known, until the publication of the *Hortus Malabaricus*, in which the delineation of it is so striking that we cannot but wonder at all perplexity, as to its prominent characters, not having been then precluded. Yet Burmann, though he had probably seen a specimen of the true Cardamom in Hermann's herbarium, and though he expressly asserts that the *Ensal* of the last-mentioned author agrees with Van Rheede's figures of the *Elettari*, and with Clusius's description and figure of "*Cardamomum minus vulgare*," (lib. 1. *Aromat.* c. 24.) makes a reference to Bontius's Java (p. 126) for the same species. Bontius, it is true, places by the side of his plant the *capsule* of the Malabar Cardamom, but, the plant itself is represented with a simple, compact spike, and seems to be no other than *Amomum compactum*, (of Solander's MSS.) or the Cardamom of Java*. In justice to Burmann,

* Specimens and a sketch of this species (the latter made on the spot, when Sir Joseph Banks was in the island of Java,) I have had opportunities of examining in the Banksian library.

however,